WHAT IS CLAIMED IS:

1. A turbo-code fast encoding device, the device is suitable for the communication system, the device is suitable for outputting parity information after the encoding process on a turbo-code of the sequential input, wherein, the input bit sequence of the turbo-code is represented as $d=(d_1,d_2,\ldots,d_k,\ldots,d_N)$, where the d_k is the input bit of the turbo-code fast encoding device at time k, k is from 1 to N, and N is the segment length, wherein, the turbo-code fast encoding device comprises:

a first recursive systematic convolution (RSC) encoder; and

a second recursive systematic convolution (RSC) encoder, wherein, the first recursive systematic convolution (RSC) encoder and the second recursive systematic convolution (RSC) encoder comply to

$$y_k = d_k + \sum_{i=1}^{M} g_{di} a_{k-i}$$

Wherein, d_k is the input bit of the turbo-code fast encoding device at time k, y_k is the parity information corresponding to d_k, g_{di} is the parameter that is generated by a first encoder feed-forward generator, the element is either 0 or 1, whereas, a_{k-i} is generated by *i*th register at time k.

2. The turbo-code fast encoding device of claim 1, wherein, the output of the first recursive systematic convolution encoder at time k is represented as $C_K=(X_k,Y_{1K})$, because the encoder is systematic, so $X_k=d_k$, a surplus code output is represented as $Y_{1k} = \sum_{i=0}^{M} g_{1fi} a_{k-i}$, herein, M is the memory order of the encoder, $(g_{1f1},g_{1f2},\ldots g_{1fM})$ is defined as G_{1f} is the first encoder feed-forward generator, the element is either 0 or 1.

3. The turbo-code fast encoding device of claim 1, wherein, the following equation $a_k = d_k + \sum_{i=1}^{M} g_{1bi} a_{k-i}$ can be obtained from the first recursive systematic convolution encoder, with the same reason, $(g_{1bf1}, g_{1b2}, \cdots g_{1bM}) = G_{1b}$ is called as the first encoder feedback generator, thus the following general equation is obtained:

$$y_{1k} = \sum_{i=0}^{M} g_{1fi} a_{k-i} = a_k + \sum_{i=1}^{M} g_{1fi} a_{k-i} = (d_k + \sum_{i=1}^{M} g_{ibi} a_{k-i}) + \sum_{i=1}^{M} g_{1fi} a_{k-i}$$

the above equation can be re-arranged as follows:

$$y_{1k} = d_k + \sum_{i=1}^{M} (g_{1bi} + g_{1fi}) a_{k-i} \equiv d_k + \sum_{i=1}^{M} g_{1di} a_{k-i}$$

4. The turbo-code fast encoding device of claim 3, wherein, the $G_{1d} = 1 \| \sum_{i=1}^{M} g_{1di} = 1 \| \sum_{i=1}^{M} (g_{1bi} + g_{1fi})$ is defined and called as the parameter of the first encoder direct-feed-forward generator, where the || represents two rows of the binary numbers that are serially concatenated.